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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,006	05/22/2000	Yoshitaka Takahashi	2271/46440-B	2446

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EXAMINER

CHU, KIM KWOK

ART UNIT PAPER NUMBER

2653

DATE MAILED: 01/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/577,006

Applicant(s)

TAKAHASHI ET AL.

Examiner

Kim-Kwok CHU

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment filed on 1/02/04 (paper 10).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-14 and 29-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 43 is/are allowed.
- 6) ☒ Claim(s) 11, 12, 14, 29-42 and 44-52 is/are rejected.
- 7) ☐ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Reissue oath/declaration

1. The reissue oath/declaration filed on August 13, 2003 (paper 6) claiming foreign priority benefits, Applicant's citizenship and his post office address has been entered.

Response to Remarks

2. Applicant's Remarks filed on January 2, 2004 (paper 10) have been fully considered but they are not persuasive.

(a) Applicant states that the prior art of Tsukai teaches away from the use of a Wollaston prism and therefore it would not have been obvious to make the modification (page 15 of the Remarks, last second paragraph). Accordingly, Tsukai discloses a conventional pickup in Fig. 2 which has all the features as in Applicant's claim 29. The modification refers to Applicant's dependent claims 37, 38 and 39.

(b) Since Tsukai's invention is to overcome the disadvantages of the conventional pickup in Fig. 2 by integrating all the optical components in a unitary pickup and replacing the expansive Wollaston prism with a small size diffraction grating, it is therefore an obvious modification because the improved integrated optical pickup has many obvious benefits such as small size, easy assembling and more reliable etc.

(c) Applicant states that Tsukai uses a diffraction grating instead of a quarter-wave plate to obtain the small angle between

the light beam radiated from the light source and the reflected beam applied to the photodetector (page 16 of the Remarks, lines 5-9). Accordingly, Applicant does not claim this feature in his claims 29-41.

Claim Objections

3. Claims 11 and 14, are objected to because of the following informalities:

(a) claims 11 and 14 are identical.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 11, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukai (U.S. Patent 4,624,526) in view of Hinenō et al. (U.S. Patent 5,428,596).

Tsukai teaches an optical pickup apparatus very similar to that of the instant invention. For example, Tsukai teaches the following:

(a) as in claim 11, a semiconductor laser 11 and at least one light-receiving element 15 (Fig. 2);

(b) as in claim 11, the semiconductor laser 11 emits light ray flux along a first optical path through an objective lens 13 onto an optical recording medium 14 in a form of a small spot to facilitate operation of recording, reproducing and/or erasing of optical information (Fig. 2);

(c) as in claim 11, the at least one light receiving element 15 receives light from a second optical path that is at least partially different from the first optical path (Fig. 2);

(d) as in claim 11, a crystal plate 16 having a discontinuous surface and being disposed in the first optical path between the semiconductor laser 11 and the objective lens 13 (Fig. 2);

(e) as in claim 11, the light ray flux emitted from the semiconductor laser 11 is transmitted along the first optical path through the crystal plate 16 to the objective lens 13 for focusing on the optical recording medium (Fig. 2); and

(f) as in claim 11, the light ray flux reflected from the optical recording medium 14 is transmitted through the crystal

plate 16 and along the second optical path to the at least one light-receiving element 15 (Fig. 2).

However, the embodiment of Tsukai as illustrated in Fig. 2 does not teach the following:

- (a) as in claim 11, the crystal plate/prism 16 is a uniaxial crystal;
- (b) as in claim 11, the semiconductor laser 11 and at least one light-receiving element 15 formed in a single stem; and
- (c) as in claims 12 and 14, the crystal plate is hermetically sealed unitarily in a package containing the semiconductor laser and the at least one light-receiving element.

Hineno teaches the following:

- (a) a crystal plate 11 made of a birefringent material such as a uniaxial crystal (Fig. 3; column 5, lines 29-31).

Tsukai in Fig. 4 teaches the following:

- (a) a light source 21 and a light-receiving element 25 are unitarily constructed by combining both of them into one (Fig. 4); and
- (b) the light source, the light-receiving element and the crystal plate 28 are hermetically sealed in a unitary package (Fig. 4).

Although Tsukai does not specify the material of making his crystal plate (Wollaston prism), however, it is well known that the Wollaston prism is made of a uniaxial crystal such as

Hineno's. Hence, for diffracting a returned light beam so that it is off the optical axis of Tsukai's laser source, it would have been obvious to use a crystal plate which is made of a uniaxial crystal such as Hineno's, because the uniaxial crystal is a birefringent material which has two refractive indexes for creating two images by diffracting a light beams in different directions.

On the other hand, to reduce the size and protect the parts of Tsukai's optical disk apparatus, optical components next to each other are formed together as a sealed single unit. Since the laser source, the light-receiving element and the crystal plate are placed very close together, it would have been obvious to one of ordinary skill in the art to hermetically sealed these components together such as Tsukai's integrated optical pickup as illustrated in Fig. 4, because the hermetically sealed laser source, light-receiving element and the crystal plate are integrated into a package so that its performance will not be affected by dust and moisture.

6. Claims 29, 31-39, 42 and 44-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukai (U.S. Patent 4,624,526) in view of Hineno et al. (U.S. Patent 5,428,596).

Tsukai teaches an optical disk apparatus very similar to that of the instant invention. For example, Tsukai teaches the following:

- (a) as in claim 29, a light source 11 (Fig. 2);
- (b) as in claim 29, an objective lens 13 for focusing light ray flux emitted from the light source 11 on an optical recording medium 14 (Fig. 2);
- (c) as in claim 29, a quarter-wave plate 17 located between the light source 11 and the optical recording medium 14 (Fig. 2);
- (d) as in claim 29, a flux separating element 16 configured to separate light rays reflected on the optical recording medium 14 from an optical axis of incident light rays (Fig. 2);
- (e) as in claim 29, the flux separating element 16 including a crystal (Wollaston prism) with a discontinuous surface disposed in an optical path between the light source 11 and the objective lens 13 (Fig. 2);
- (f) as in claim 29, a light-receiving element 15 positioned adjacent the light source 11 and at a front side for detecting a signal from the reflection light rays (Fig. 2);

(g) as in claim 31, the light-emitting source 11 is at a different height from that of the light-receiving element 15 (Fig. 2);

(h) as in claim 32, the flux separating element 16 comprises a prism disposed in the optical path between the light source 11 and the quarter-wave plate 17 (Fig. 2);

(i) as in claim 33, the optical disc apparatus is an optical pickup (Fig. 2);

(j) as in claim 34, an optical disc system comprising the optical disc apparatus (Fig. 2);

(k) as in claim 35, the light source 11 is a semiconductor laser (Fig. 2); and

(l) as in claim 36, an incident plain surface of the flux separating element 16 is not perpendicular to the optical axis (Fig. 2).

However, the embodiment of Tsukai as illustrated in Fig. 2 does not teach the following:

(a) as in claims 29 and 32, the prism 16 is a uniaxial crystal;

(b) as in claim 37, the light source and the light-receiving element are unitarily constructed by combining both of them into one;

(c) as in claim 38, the flux separating element is employed as a window member of the light source; and

(d) as in claim 39, the light source, the light-receiving element, the flux separating element, the quarter-wave plate and the objective lens are mounted unitarily to form a unitary optical pickup portion.

Hineno teaches the following:

(a) a Wollaston prism 11 made of a birefringent material such as a uniaxial crystal (Fig. 3; column 5, lines 29-31).

Tsukai in Fig. 4 teaches the following:

(a) a light source 21 and a light-receiving element 25 are unitarily constructed by combining both of them into one (Fig. 4);

(b) the flux separating element 28 is employed as a window member of the light source (Fig. 4); and

(c) as in claim 39, the light source, the light-receiving element, the flux separating element and the objective lens are mounted unitarily to form a unitary optical pickup portion (Fig. 4).

Although Tsukai does not specify the material of making his Wollaston prism, however, it is well known that the Wollaston prism is made of a uniaxial crystal such as Hineno's.

Hence, for diffracting a returned light beam so that it is off the optical axis of Tsukai's laser source, it would have been obvious to use a Wollaston prism which is made of a uniaxial crystal such as Hineno's, because the uniaxial crystal

is a birefringent material which has two refractive indexes for creating two images by diffracting a light beams in different directions.

On the other hand, to reduce the size of Tsukai's optical disk apparatus, optical components next to each other are formed together as a single unit. Regarding the laser source which is very close to the light-receiving element, it would have been obvious to one of ordinary skill in the art to combine these two components together such as Tsukai's integrated laser source and photodetector as illustrated in Fig. 4, because the united laser source and the light-receiving element are in an integrated form in order to simplify the construction of Tsukai's optical disk apparatus.

Similarly, regarding Tsukai's light source, the light-receiving element, the flux separating element and the objective lens, it would have been obvious to one of ordinary skill in the art to position the flux separating element in front of the laser source as a window member, and then to mount the rest of the optical components such as the objective lens and the quarter-wave plate in a unitarily form such as Tsukai's as illustrated in Fig. 4, because such arrangement can simplify the construction of Tsukai's optical disk apparatus.

7. Claims 42 and 44 have limitations similar to those treated in the above rejection, and are met by the references as discussed above. Claim 42 however also recites the following limitations which are taught by the cited prior art of Tsukai:

(a) as in claim 42, the flux separating element 16 being disposed in a divergent optical path (Fig.2).

8. Claims 45-48 have limitations similar to those treated in the above rejection, and are met by the references as discussed above. Claims 46 and 47 however also recite the following limitations which are taught by the cited prior art of Tsukai:

(a) as in claim 46, the emitting and detecting directions are at an oblique angle to each other (Fig. 2); and

(b) as in claim 47, the light source and detector are spaced from each other in a direction transverse to both the emitting and the detecting directions (Fig. 2).

9. Claims 49-52 have limitations similar to those treated in the above rejection, and are met by the references as discussed above. Claims 50 and 51 however also recite the following limitations which are taught by the cited prior art of Tsukai:

(a) as in claim 50, the emitting and detecting directions are at an oblique angle to each other (Fig. 2); and

(b) as in claim 51, the light source and detector are spaced from each other in a direction transverse to both the emitting and the detecting directions (Fig. 2).

10. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukai (U.S. Patent 4,624,526) in view of Hineno et al. (U.S. Patent 5,428,596) and of Lee (U.S. Patent 5,136,152).

Tsukai in view of Hineno teaches an optical pickup very similar to that of the instant invention. However, both Tsukai and Hineno do not teach the following:

(a) as in claim 30, a collimator lens located between the flux separating element and the optical recording medium.

Lee teaches an optical pickup having a collimator lens 850 located between the flux separating element 840 and an optical recording medium 880 (Fig. 8).

A light beam should be parallel before it is focused by an objective lens. Therefore, to guide the light beam toward the

objective lens, it would have been obvious to one of the ordinary skill in the art to position a collimator lens such as Lee's in Tsukai's optical head between a light separating means and a recording medium, because the collimator can convert any divergent light beam exited from the light separating means into a collimated beam so that it can be equally focused.

11. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukai (U.S. Patent 4,624,526) in view of Hineno et al. (U.S. Patent 5,428,596) and of Ando (U.S. Patent 4,804,835).

Tsukai in view of Hineno teaches an optical pickup very similar to that of the instant invention. However, both Tsukai and Hineno do not teach the following:

(a) as in claim 40; the unitary optical pickup portion is accommodated in an actuator movable portion which can be moved both in a tracking direction and in a focusing direction; and

(b) as in claim 41, the light source, the light-receiving element, the flux separating element, the quarter-wave plate and the objective lens are accommodated in an actuator movable portion which can be moved both in a tracking direction and in a focusing direction.

Ando teaches the following:

(a) an unitary optical pickup portion 5 is accommodated in an actuator movable portion 81 which can be moved both in a tracking direction and in a focusing direction (Figs. 1 and 10).

An optical pickup moves across an optical disk so that a light beam can be irradiated and reflected on the disk surface for accessing information. Hence, for focusing and tracking the light beam on information located on the disk's surface, it would have been obvious to one of ordinary skill in the art to use an actuator similar to Ando's so that Tsukai's objective lens can properly focus the light beam in the right track.

Allowable Subject Matter

12. Claim 43 is allowable over the prior art of record.

13. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is an Examiner's Statement of Reasons for Allowance:

As in claim 13, the prior art of record fails to teach or fairly suggest an optical pickup wherein the at least one light-receiving element formed on the stem consists of two pieces of two-divisional light-receiving elements respectively having dividing directions different from each other, and a height of one of the light-receiving elements is the same as a height of the semiconductor laser, while a height of another one of the light-receiving elements is different from the height of the semiconductor laser.

As in claim 43, the prior art of record fails to teach or fairly suggest an optical pickup having two pieces of prism consisting of same sort of uniaxial crystal respectively having optical axes intersecting perpendicularly to each other are employed as a flux separating element, such that when a

refractive index for ordinary light rays of the prism η_0 is larger than a refractive index for extraordinary light rays η_e , an incident angle of the ordinary light rays transmitted through the first prism to the second prism is δ , and a counterclockwise angle from the optical axis of the ordinary light rays is in a plus (+) direction when the value of δ becomes larger than zero, and such that when η_0 is larger than η_e , an incident angle of the extraordinary light rays transmitted through the first prism to the second prism is δ , and a counterclockwise angle from the optical axis of the extraordinary light rays is in a plus (+) direction when the value of δ becomes smaller than zero ($\delta < 0$).

The features indicated above, in combination with the other elements of the claims, are not anticipated by, nor made obvious over, the prior art of record.

15. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C.
20231 Or faxed to:

(703) 872-9306 (for formal communications intended for
entry. Or:

(703) 746-6909, (for informal or draft communications,
please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park
II, 2021 Crystal Drive, Arlington. VA., Sixth Floor
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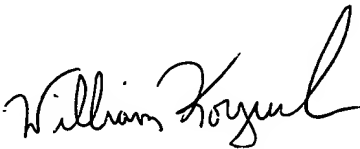
Any inquiry of a general nature or relating to the status of
this application should be directed to the Group receptionist
whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier
communications from the examiner should be directed to Kim CHU
whose telephone number is (703) 305-3032 between 9:30 am to 6:00
pm, Monday to Friday.

kc 1/21/04

Kim-kwok CHU

Examiner AU2653
January 21, 2004
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